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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 20

Application Number: 09/682,142
Filing Date: July 26, 2001
Appellant(s): SIVAVEC ET AL.

Philip Freedman

For Appellants

EXAMINER'S ANSWER

This is in response to the appellants' brief on appeal filed 8 September 2003 and amended 6 November 2003.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellants' statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is substantially correct with the exception of one point. The word "precise" is not used in the original disclosure to describe the placement of the sensors.

It should be noted that appellants have included an additional section of the brief directed to describing the prior art. While this section is not required by 37 C.F.R. 1.192(c), it is not believed to make the brief defective. Furthermore, it is not considered to present any additional arguments nor to be the basis for any new arguments. Therefore, it has only been treated as appellants' summary of the prior art. However, the examiner's belief does not prevent the Board of Appeals from taking whatever actions they believe to be appropriate. The examiner makes substitute comments with respect to appellants' summary in Appendix B.

(6) Issues

The appellants' statement of the issues in the brief is substantially correct.

(7) Grouping of Claims

The appellants' statement in the brief that certain claims do not stand or fall together is not agreed with because appellants are arguing that Group XI includes "Claims 23 to 25 and 29 to 43". However, claims 36 to 43 have been are cancelled. Therefore Group XI is limited to claims 23-25 and 29-35.

It should be noted that page 13 of the brief "Groups I to XV" should be --Groups I to XII-- since there are only 12 groups listed by appellants.

(8) Claims Appealed

A minor error in claim 1 is present since it ends in two periods.

Claims 57 and 66 contain(s) substantial errors as presented in the Appendix to the brief. The errors in claims 57 and 66 are explained here in an effort to assist the Board. Accordingly, claims 57 and 66 are correctly written in Appendix A to the Examiner's Answer.

When appellants amended claim 57 to correctly depend from claim 56, rather than itself, appellants amended claim 57 to be a substantial duplicate of claim 56. Appellants have now submitted a claim 57 different than the claim as amended on Feb 3, 2003.

Claim 66 is incomplete. Claim 66 was amended 3 Feb 2003 to include an additional paragraph at the end of the claim which is now missing from the claims in appellants' appendix.

(9) Prior Art of Record

5639380	Misquitta	6-1997

"Field Applications of *In Situ* Remediation Technologies: Permeable Reactive Barriers", US EPA Document No. 542-R-99-002, April 1999, 122 pages, hereafter called The PRB Papers.

"Design Guidance for Application of Permeable Barriers to Remediate Dissolved Chlorinated Solvents" Proponent: CEMP, US Army Corps of Engineers Document No. DG 1110-345-117, Feb 97, 192 pages, hereafter called The Corps of Engineers Papers.

Examiner does not necessarily agree with the appellants' description of the applied references, pages 4-12. There are at least several errors in the summary, which are discussed in Appendix B.

**6491828 Sivavec et al. 12-2002

**U S Patent 6491828 issued to the same assignee and one of the appellants has recently come to the attention of the examiner and may be of interest to the Board of Appeals, especially col 1, line 34 – col 2, line 31, which discusses the need for cost-saving effective means for real-time groundwater monitoring, diagnosing, and reporting, as well as the problems of remediation sites often being remote from a laboratory, sample transportation costs, and time delays in sample analysis. All these problems are common to any groundwater remediation site, not just pump-and-treat sites.

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1--35, and 44-66 are rejected under 35 U.S.C. 103(a). This rejection is set forth in prior Office Action, Paper No. 14 mailed 23 April 2003, which is incorporated herein by reference.

Claims 1--35, and 44-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over The PRB Papers in view of Misquitta US Patent 5639380.

Re claims 1 and 44: The PRB Papers teach a method comprising conducting a PRB treatment of a contaminated aqueous medium and in-well monitoring effectiveness of the PRB treatment in the Introduction pages 1, 2 and pages 5, 7, 13, 20, 34, 36, and 37. Multiple other teachings are throughout also. Examiner notes that The PRB Papers in page 36 paragraph 1 and page 74 paragraph 2, for example, teach that dedicated *in-situ* flow sensors and ground water monitoring wells are installed to track performance. Misquitta teaches in-well monitoring and wireless transmission to a remote collector, or monitor, in Figs 5 and 10, and col 6, lines 47-60 and col 8, lines 21-40 referring to Fig 8. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified The PRB Papers to include in-well monitoring and wireless transmission as taught by Misquitta in order to obtain accurate and dynamic readings (Misquitta at col 6, lines 15-25) of groundwater parameters with a minimum of on-site manpower (Misquitta at col 8, lines 25-29).

Re claims 15-16: The PRB Papers teach monitoring based on both pH and Eh (oxidation-reduction potential) in page 13 paragraph 3. Pages 19-20 teach a site in South Carolina where both pH and eH were monitored to determine effectiveness of remediation.

Re claim 17: Reactive material (zero valent iron) in the barrier zone is taught by The PRB Papers page 5, 4th paragraph and in general on page 2 paragraphs 2-3.

Re claims 18-19: The PRB Papers teach forming the PRB by digging a trench and placing reactive material within the trench and conducting PRB treatment within the trench, with the trench in the path of the contaminated plume on page 2, paragraph 4.

Re claims 45-46: Misquitta teaches a monitor in col 6, lines 47-60, and in the abstract. Absent any criticality, the location of the monitor outside the PRB would be an obvious design choice, and be particularly likely if the PRB contained hazardous or damaging chemicals. Note that Misquitta states the obvious, in col 5, line 64 – col 6, line 6, that the test setup can be inside or outside the contaminated area based on site conditions. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified The PRB Papers to include the location of the monitor outside the PRB as taught by Misquitta in order to allow easy, safe, and remote monitoring of possibly hazardous conditions (Misquitta at col 8, lines 25-29).

Re claims 2-14, 20-30, and 47-54: The PRB Papers teach up-gradient and down-gradient monitoring wells in page 5, paragraph 5, and multiple other occurrences. Page 61, paragraph 6, teaches monitoring wells located along a transect of the PRB zone. Pages 24-25 teach a 6' wide PRB and teaches that the wells placed are along the upgradient face, the center, and the downgradient face, thus within 25 and 6 feet up- and down- gradient of the PRB and including wells within 2 feet of the PRB or within the PRB. A plurality of sensors is taught on page 13, under the heading "Results" and both pH and VOC concentrations were measured, and page 37, paragraph 5, teaches water level monitoring, thus at least 2 sensors were used.

As discussed above, Misquitta teaches in-well monitoring and wireless transmission to a remote collector or monitor. Monitoring wells have an open screen interval to allow the monitored fluid to flow into the well, as disclosed in The PRB Papers page 42, paragraph 4, and page 24, bottom paragraph to page 25, top paragraph. Designing the system to meet site requirements is taught in paragraphs 2-4 on page 91 and paragraphs 1-4 on page 20, and would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have located the monitoring wells with in-well sensors in certain locations relative to the contamination, both vertically and horizontally, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Examiner notes that routine experimentation, based on contamination levels and types, site conditions and limitations, soil permeability, and other factors known to influence remediation work, would be routinely required in any remediation or site assessment project, and notes that The PRB Papers, on page 2, paragraphs 2-3, teach that site parameters dictate treatment parameters. Adjusting the treatment based on monitoring data is taught by The PRB Papers on page 20, paragraphs 1-4, page 42, pages 93-94, and the bottom paragraph of page 39, and Misquitta in Fig 6. The method is obvious in the system description and usage.

Re claims 31-35 and 55-62: A transmitter, collector to receive a signal from the transmitter and capable of transmitting a signal to a monitor, and a communication link between said collector and monitor and the method of monitoring and transmitting

contaminant data is taught in Misquitta in col 6, lines 47-60 and col 7, lines 7-21. Col 8, lines 14-40 teach wireless interconnected {web} communication links using radio communications. Transmission of data implies a remote monitor. Two way communication is taught by Misquitta in col 6, line 61- col 7, line 1, Fig 6, and col 10, lines 41-46. Outputting a contaminant report is taught by Misquitta in col 7, lines 40-49 and col 10, lines 35-36. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified The PRB Papers to include a transmitter, a collector to receive a signal from the transmitter and capable of transmitting a signal to a monitor, and a communication link between said collector and monitor as taught by Misquitta in order to automate the monitoring process and obtain "real-time" data and process corrections as elaborated in col 10, lines 41-46 and allow easy, safe, and remote monitoring (Misquitta col 8, lines 21-40) of possibly hazardous conditions using off-the-shelf and known equipment.

Re claim 63: The PRB Papers teach chemical sensors in 1st paragraph on page 20 and page 34. Misquitta teaches chemical sensors in col 7, lines 4-7.

Re claims 64-65: A plurality of sensors in a plurality of wells {a plurality of monitoring wells with sensors} arranged along a substantially longitudinal axis of the PRB zone facing the fluid flow (AA-116,115, and 113) and substantially along a transect to the PRB zone (AA-111,112,113, and 114) is taught in Fig. 1.

Re claim 66: A PRB and a sensor located along a substantially longitudinal axis of the PRB zone facing the fluid flow or substantially along a transect to the PRB zone is taught in The PRB Papers on page 61 paragraph 6. As discussed above, Misquitta

teaches in-well monitoring and wireless transmission to a remote collector or monitor. Examiner notes it would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have located the sensor and well in the specific area where data is best generated, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Claims 1--35, and 44-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over The Corps of Engineers Papers, in view of Misquitta US Patent 5639380.

Re claims 44-46: The Corps of Engineers Papers teach a method comprising conducting a PRB treatment of a contaminated aqueous medium and in-well monitoring effectiveness of the PRB treatment in Sections 1,7,8, and Appendix A and E. Examiner notes specifically Corps of Engineers Papers section 8.2.1 on page 82 and page 81, section 8.1.2 and section 3.3.1, page 26. The Corps of Engineers Papers teach all the elements except a remote monitor, in-well sensor, and wireless transmitter. Misquitta teaches in-well monitoring and wireless transmission to a remote collector or monitor in Figs 5 and 10 and col 6, lines 47-60 and col 8, lines 21-40 referring to Fig 8. Absent any criticality, the location of the monitor outside the PRB would be an obvious design choice, and be particularly likely if the PRB contained hazardous or damaging chemicals. Note that Misquitta states the obvious, in col 5, line 64 – col 6 line 6, that the test setup can be inside or outside the contaminated area based on site conditions. Therefore, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to have modified The Corps of Engineers Papers to include the location of the monitor outside the PRB and remote monitoring of wireless transmissions from in-well sensors as taught by Misquitta in order to allow easy, safe, and remote monitoring (Misquitta col 8, lines 21-40) of possibly hazardous conditions

Re claims 1—14, 20-30 and 47-54: The Corps of Engineers Papers teach a method comprising conducting a PRB treatment of a contaminated aqueous medium and in-well monitoring effectiveness of the PRB treatment in Sections 1,7,8, and Appendix A and E. Examiner notes specifically The Corps of Engineers Papers section 8.2.1 on page 82, section 8.1.2 on page 81, and section 3.3.1 on page 26. The Corps of Engineers Papers teach up-gradient and down-gradient monitoring wells in paragraph 3, page 56. Fig. 8.1 teaches monitoring wells located along a transect of the PRB zone. A plurality of sensors is taught in page 26, paragraph 2 and page 81, paragraph 2. Monitoring wells have an open screen interval to allow the monitored fluid to flow into the well, as disclosed in The Corps of Engineers Papers section 8. Designing the system to meet site requirements is taught in first paragraph page vii and section 1.8, page 9 and paragraph 5, page 48. The Corps of Engineers Papers teach all the elements except a remote monitor, in-well sensor, and wireless transmitter. Misquitta teaches in-well monitoring and wireless transmission to a remote collector or monitor in Figs 5 and 10 and col 6, lines 47-60. Examiner notes that routine experimentation, based on contamination levels and types, site conditions and limitations, soil permeability, and other factors known to influence remediation work, would be routinely required in any remediation or site assessment project, and notes

that the page 84, paragraph 1 of Corps of Engineers Papers teach that additional wells are determined based on pilot studies. Adjusting the treatment based on monitoring data is taught by section 8 and the Executive Summary, and Misquitta in Fig 6. The method is obvious in the system description and usage. Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have located the monitoring wells with in-well sensors and wireless transmission to remote monitoring stations, as taught by Misquitta, in order to allow easy, safe, and remote monitoring (Misquitta col 8, lines 21-40) of possibly hazardous conditions, and it would be also obvious to locate the wells in certain locations, such as within 2, 6, or 25 feet of the PRB relative to the contamination, both vertically and horizontally, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Re claims 15-16: The Corps of Engineers Papers in page 81 section 8.1.2 and section 3.3.1 page 26 teach monitoring based on pH and Eh (redox potential) and that it is very important to do so.

Re claim 17: Reactive material (zero valent iron especially) in the barrier zone is taught by The Corps of Engineers Papers on pages 28-32.

Re claims 18-19: The Corps of Engineers Papers in the Executive Summary paragraph 4, page V, teach forming the PRB by digging a trench and placing reactive material within the trench and conducting PRB treatment within the trench, with the trench in the path of the contaminated plume.

Re claims 31-35 and 55-62: A transmitter, collector to receive a signal from the transmitter and capable of transmitting a signal to a monitor, and a communication link between said collector and monitor and the method of monitoring and transmitting contaminant data is taught in Misquitta in col 6, lines 47-60 and col 7, lines 7-21. Col 8, lines 14-40 teach wireless interconnected {web} communication links using radio communications. Transmission of data implies a remote monitor. Two way communication is taught by Misquitta in col 6, line 61- col 7, line 1, Fig 6, and col 10, lines 41-46. Outputting a contaminant report is taught by Misquitta in col 7, lines 40-49 and col 10,lines 35-36.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified The Corps of Engineers Papers to include a transmitter, a collector to receive a signal from the transmitter and capable of transmitting a signal to a monitor, and a communication link between said collector and monitor as taught by Misquitta in order to automate the monitoring process and obtain "real-time" data and process corrections as elaborated in col 10, lines 41-46 and allow easy, safe, and remote monitoring (Misquitta col 8, lines 21-40) of possibly hazardous conditions using available and known equipment.

Re claim 63: Corps of Engineers Papers teach in-well chemical sensors in page 81, section 8.1.2 and section 3.3.1, page 26. Misquitta teaches chemical sensors in col 7, lines 4-7.

Re claims 64-65: A plurality of sensors in a plurality of wells {a plurality of monitoring wells with sensors} arranged along a substantially longitudinal axis of the

PRB zone facing the fluid flow and substantially along a transect to the PRB zone is taught in Fig. 8.1, sections 8.1.1 - 8.1.3 on pages 76-82, and sections 3.3, 3.3.1, and 3.3.2 on pages 26-27 of The Corps of Engineers Papers.

Re claim 66: A PRB and a sensor located in a monitoring well located along a substantially longitudinal axis of the PRB zone facing the fluid flow or substantially along a transect to the PRB zone is taught in The Corps of Engineers Papers Fig 8.1 and section 8. Misquitta's teaching of in-well sensors has been previously cited. Examiner notes it would have been considered obvious to one of ordinary skill in the art, at the time the invention was made, to have located the sensor and well in the specific area where data is best generated, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

(11) Response to Argument

Re Group 1, claims 1, 5, 15, 17-22, 44-46, 50, 51, 55-61, and 63-65, *(Improper combination of references):* Appellants are arguing an improper combination of references. As stated in previous office action, in response to appellants' argument that Misquitta is nonanalogous art, it has been held that a prior art reference must either be in the field of appellants' endeavor or, if not, then be reasonably pertinent to the particular problem with which the appellants were concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). *Oetiker* requires a two-part test:

(1) is the invention in the same field of endeavor?

(2) if not, is the same problem being addressed?

The field of endeavor for appellants' invention and that of The PRB Papers and The Corps of Engineers Papers and Misquitta is remediation of contaminated groundwater. Therefore, it is considered that the first part of the test is met and the art is analogous If, however, it is considered that the references are not from the same field of endeavor, the second part of the test is considered to be met. The problem being solved by both appellants and Misquitta is the transmission of groundwater data from a monitoring well. No difference can be seen between appellants' well monitoring and the well monitoring in Misquitta.

In response to appellants' arguments that a "technical teaching" has not been provided as required by *In re Lee,* 61 USPQ 2d 1430 (Fed. Cir. 2002), the examiner has read this case and cannot find anywhere within it the requirement for a "technical teaching". As the Federal Circuit stated:

The examiner can satisfy the burden of showing obviousness of the combination only by showing some objective teaching in the prior art...(citing *In re Fritch*, 23 USPQ 2d 1780 (Fed. Cir. 1992), underlining added). *Lee* at 1434.

The examiner has provided an objective teaching from The PRB Papers, The Corps of Engineers Papers, and the Misquitta reference that persons of ordinary skill in the art are concerned with cost and site conditions when installing and monitoring a groundwater treatment system (Each of the 39 sites summarized in The PRB Papers has a section on "Costs", Chapter 9 of the Corps of Engineers Papers is titled "PRB Economics" and has subsections on Capital Costs and Operating and Maintenance

Costs, and Misquitta col 8 lines 25-29). As stated by Misquitta and used in the rejection, persons of ordinary skill in the art would be motivated to use "in-well" "wireless monitoring" in order to obtain the monitoring data from the PRB monitoring wells at a lower cost, especially if the terrain was remote, difficult to run wires or cables, hazardous, etc. Contaminated sites, especially those with hazardous organic volatile contaminates as disclosed by applicant in paragraph [0004],

> ...A wide variety of chlorinated hydrocarbons, including chlorinated ethenes such as trichloroethene (TCE) and tetrachloroethene (PCE) and their products, dichloroethene (DCE) and vinyl chloride (VC), are effectively treated by this method, often at a significant cost savings when compared to conventional pump-and-treat alternatives.

often have regulatory requirements to limit personnel exposure due to the contamination. Thus wireless monitoring, not requiring installation of conduit and cables for data transmission, would be advantageous at contaminated sites as taught by Misquitta in col 8 lines 25-29.

Regarding the motivation to combine, Misquitta states in col 8, lines 25-29 that transmission by wireless means, such as radio waves "is useful in sites where the terrain or cost mitigates against the use of laying down signal runs, for instance, electrical or optical..." Misquitta is not a teaching in the field of economics, as applicant argues, but a teaching of communicating data from monitoring wells used in groundwater remediation. Examiner stated as common knowledge that considering costs in projects, as pointed out in Misquitta, would be of interest and also motivational to any project, especially if the project was remote or hazardous, as contaminated sites often are.

Further, each of the summaries of PRB remediation projects at approximately 39 different sites in The PRB Papers contains a subsection headed "Cost" which summarizes the cost of the PRB system design, construction, material, and installation. Of the ten sections in The Corps of Engineers Papers, Section 9.0 is titled "Permeable Barrier Economics" and includes subsections on Capital Costs and Operating and Maintenance Cost Considerations. Thus Misquitta's teaching that wireless transmission can save on costs when transmitting data (col 8, lines 21-34) on groundwater parameters such as groundwater level, contaminant concentration (col 6, lines 47-53) from monitoring wells would be relevant to the issues of monitoring and transmitting groundwater data at remediation sites employing PRBs.

It should be pointed out that appellants have never addressed the motivation set forth in the rejection that Misquitta provides a means of obtaining accurate and dynamic readings of the groundwater parameters with a minimum of on-site manpower based on the use of in-well monitoring and remote wireless transmission of the readings. Appellants never challenge the fact that Misquitta teaches safe and remote monitoring of possibly hazardous conditions. As set forth in *In re Lee*, objective teachings are set forth in the modifying reference which are not contraverted by appellants.

Re Group 1, claims 1, 5, 15, 17-22, 44-46, 50, 51, 55-61, and 63-65, *(No prima facie Case):* Appellants argue on pages 15 and 16 of their brief that

> the references do not establish a prima facie case of obviousness of "in-well" "wireless communications," claims 1 to 22 or of "a transmitter

associated with the sensor in well to wirelessly transmit a signal," claims 44 to 65.

As pointed out and quoted in previous office actions, Misquitta teaches in-well monitoring and wireless transmission to a remote collector or monitor in Figs 5 and 10, col 6, lines 47-60, and col 8, lines 21-40 referring to Fig 8. Specifically, Col 8, lines 22-23 state "signal 410 from monitoring device 510 is transmitted by wireless means, such as radio waves. Wireless transmission is not required for passive treatments. As stated by appellants in the original disclosure at paragraphs [0032], [0034], and claims 34 and 61, hardwired and wireless transmission are alternatives used for data communication with the present invention. However, it is not the data transmission that disrupts the flow, but the use of prior art methods of sampling that cause disruption. In-well sensors avoid disruption. Misquitta teaches wireless transmission of groundwater data.

Note: *Appellants have argued the meaning of "in-well" "wireless transmissions" as the main point in the arguments in the previous Amendments and Arguments and Requests for Reconsideration. Therefore, the examiner is addressing this argument in the event this interpretation is argued in oral hearings. Please see* ***Appendix C*** *for this argument.*

Re Group II – Claims 2 and 47 *(no prima facie case):* Appellants are arguing that the Final Rejection incorrectly addressed the upgradient and downgradient monitoring wells as described in claims 2 and 47, and appellants argue that neither The PRB Papers nor The Corps of Engineers Papers teach or suggest wells "about 25 feet upgradient ...about 25 feet downgradient". Appellants state that The Corps of

Engineers Papers on page 56 paragraph 3 teach upgradient and downgradient sections of pea gravel, not monitoring wells. Appellants also argue that the PTO must indicate where the teaching appears and that it failed to do so.

Quoting from examiner's non-final office action mailed 1/23/2003, page 6, lines 4-7 and examiner's final office action mailed 4/23/2003, page 4 lines 2-5:

> *Pages 24-25 (of The PRB Papers) teach a 6' wide PRB and teaches that the wells placed are along the upgradient face, the center, and the downgradient face, thus within 25 and 6 feet up- and down- gradient of the PRB and including wells within 2 feet of the PRB or within the PRB.*

Examiner rejected the claims, stating the location at up to about 25 feet, upgradient or downgradient from the PRB would be obvious to one of ordinary skill in the art – the result of routine experimentation to discover an optimum or workable range. Appellants have disclosed no criticality for these ranges.

First, it should be pointed out that claim 2 has been misquoted by appellants. Claim 2 sets forth that the up-gradient well is "up to about 25 feet" from the PRB and the down-gradient well is "up to about 25 feet" from the PRB. Appellants' claim is for a range in which the wells may be placed. Giving the language its ordinary and plain meaning, "up to about 25 feet" has been interpreted to be anywhere from 0 feet from the PRB to 25 feet from the PRB, not "about 25 feet" as appellants are now arguing.

Second, Examiner notes that the statements appellants attribute to the Final Rejection were originally made in the non-final office action mailed 1/13/2003. Appellants never addressed or challenged examiner's rejection of this limitation in any of the:

10 page "Draft Amendment and Remarks" faxed on 2/10/2003

in-person interview held 2/11/2003

10 page Amendment and Arguments filed 2/13/2003,

17 page Request for Reconsideration filed 3/31/2003,

2nd 17 page Request for Reconsideration filed 5/20/2003.

Thus the examiner considered that the rejection was accepted by appellants, especially in view of the interview, which was documented in the interview summary provided to appellants' representative and mailed with office action 3/11/2003, that the appellants considered the main argument to be that a prima facie case was not made for "wireless transmitter". Further, *a third non-final* action was mailed on 3/11/2003, which could have addressed appellants' current argument that the specific location of the monitoring wells was not taught. Thus it was considered that appellants have acquiesced to this point.

In response to this new argument, Fig. B-1, page B-11 of The Corps of Engineers Papers teaches monitoring wells (Diamond shaped, labeled as "single monitoring well, typical, 10 required") in the pea gravel upstream and downstream of the PRB, and in the center of the PRB. The pea gravel sections are labeled 2' wide each, thus the wells are about 1 foot upstream, 1 foot downstream, and in the center of the PRB. Figure E-3, page E-6 shows monitoring wells 1.5 meters downstream, inside of the PRB, and 4.6 meters upstream of the PRB. Figure E-12, page E-23 shows monitoring wells approximately 2 meters upstream and 1 meter downstream for a PRB. Page 8, section 1.6 and page 9, section 1.8 emphasize that hydrogeologic modeling along with site

characterization data is used to plan appropriate monitoring well locations, and Table 2-2, pages 19-21 show monitoring well locations in "various locations in iron and downgradient pea gravel", "upgradient and downgradient", " 2 wells upgradient, 3 downgradient, 6 in iron", etc.

The PRB Papers teach in many of the 39 sites that monitoring wells were extensively used. Page 27, last paragraph teaches that "34 wells located within and proximate to" the PRB were used for monitoring the system's performance. Page 34, first paragraph teaches that 348 monitoring wells were installed upgradient, downgradient, and within the PRB. Page 44, first paragraph teaches that about 70 monitoring wells in or near the reactive barrier were used. Page 61, last paragraph teaches "monitoring wells were installed along a transect parallel to groundwater flow". Combined with Misquitta's statement concerning monitoring wells in col 5, lines 20-23,

> *The choice of locations for these wells may be arbitrary in some instances, or may, in other cases, be determined after a study of a particular site...*

the examiner maintains the placement would be obvious to one of ordinary skill in the art based on site characteristics, contaminants, and engineering modeling.

Finally, examiner notes that appellants provided a sworn declaration on 11/29/2002 swearing behind a previously applied patent, Borden et al. USP 6398960. This declaration and its attached internal "Patent Disclosure Letter" provide no criticality or even mention of the specific location of the wells. Page 2 of the Patent Disclosure Letter, lines 1-6 discloses only that well placement and design are important, wells are placed upgradient and downgradient of the PRB, and are often also located to ensure flow is not around, under, or over the PRB. A listing of

references with the declaration listed 26 references as part of the Patent Disclosure Letter (references not listed on appellants' IDS or provided to the USPTO). Examiner provided and cited on line "V" of PTO form 892 mailed 1/23/2003, reference EPA/600/R-98/125, hereafter called the EPA Paper, which was listed on the appellants' reference list. The EPA Paper lists Timothy Sivavec, one of the appellants of the pending application, as a co-author and teaches on page 35:

> *All known information about the site should be assessed prior to mobilizing the field characterization. Usually some information has been obtained in the process of discovering that there is a contamination problem. Due to regulatory concerns and reporting requirements, monitoring wells may have been installed shortly after this discovery to evaluate the contaminant(s) and its concentration. This information can be combined with historical records, the memories of current or former workers, and surface features to obtain at least a general idea of the location of the source term(s) and its nature. General information on topics such as aquifer locations, yields and water table depths, water quality, stratigraphy, recharge areas, drainage basins, etc., can often be obtained from local, state and federal agencies. Although this information might not be sufficient at the (usually) smaller scale of the contaminated site for effecting a complete remedial design, it can be very helpful in designing the site characterization effort. When this information has been compiled, the choice of locations and screen depths for a few, select aquifer testing/monitoring wells can be made.*

Further page 47, section 8.2 teaches:

> *Pilot-scale systems at Lowry AFB and NAS Moffett Field (installed under the auspices of AFCEE and the U.S. Navy, respectively), at CFB Borden in Ontario, and at a private facility in New York State are much better suited to this purpose. Monitoring wells at these sites are located at various* distances in the PRB, as well as on the upgradient and downgradient sides (Figure 17). This allows multiple point VOC concentrations vs. distance profiles to be obtained, which can be used to calculate field degradation rates.

The Figure 17 referred to in the EPA Paper above is the same as Figure E-3, page E-6 of The PRB Papers discussed above. Fig 12, page 42 of the EPA Paper shows the PRB configuration of Mountainview, California:

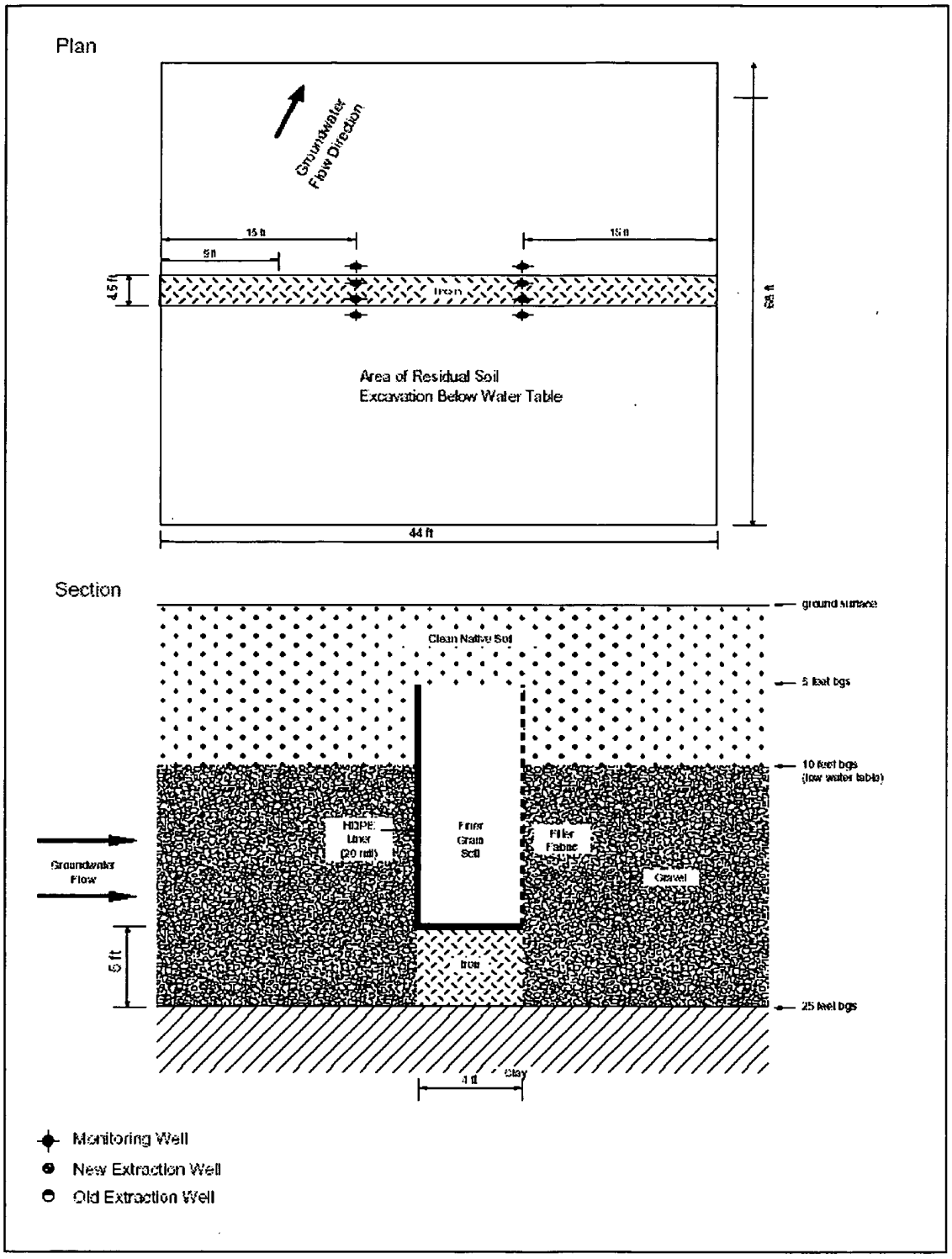

Figure 12. PRB configuration, Mountainview, California.

This Figure, showing the layout at Mountainview California, supports examiner's assertion that locating monitoring wells upgradient, downgradient, and within the PRB as disclosed by appellants was known to one of ordinary skill in the art, as the PRB project in Mountainview California was one of the 39 sites disclosed in The PRB Papers and was also disclosed in the EPA Paper published in 9/1998 which one appellant co-authored.

Re Group II – Claims 2 and 47 *(Improper combination of references):* as addressed in "**Re Group 1,** *(Improper combination of references)"* above, examiner believes the combination was proper.

Re Group III – Claims 3 and 48 *(Improper combination of references):* as addressed in "**Re Group 1,** *(Improper combination of references)"* above, examiner believes the combination was proper.

Re Group III – Claims 3 and 48 *(no prim [sic] facie case):* as addressed in "**Re Group II,** *(no prima facie case)* above, examiner believes the rejection was established by the references and thus was proper. This is also a new argument to a repeated rejection. It is considered that appellants acquiesced to this rejection as well. Please see **Re Group II** *(no prima facie case) above.* The limitations of well placements 1 to 6 feet from the PRB upgradient and downgradient were included in the discussion above.

Re Group IV – Claims 4 and 49 *(Improper combination of references):* as addressed in "**Re Group 1,** *(Improper combination of references)"* above, examiner believes the combination was proper.

Re Group IV – Claims 4 and 49 *(no prim [sic] facie case):* as addressed in "**Re Group II,** *(no prima facie case)* above, examiner believes the rejection was established by the references and thus was proper. This is also a new argument to a repeated rejection. It is considered that appellants acquiesced to this rejection as well. Please see **Re Group II** *(no prima facie case) above.* The limitations of well placements 2 to 4 feet from the PRB upgradient and downgradient were included in the discussion above. Although appellants' argument on page 18, paragraph 1 under group IV, lines 5-6 seems to mix claims 4 and 49 with claims 3 and 48, examiner will assume appellants intended to argue the limitations as disclosed in claims 4 and 49 and is responding accordingly.

Re Group V – Claims 6, 26, and 52 *(Improper combination of references):* as addressed in "**Re Group 1,** *(Improper combination of references)"* above, examiner believes the combination was proper.

Re Group V – Claims 6, 26, and 52 *(no prim [sic] facie case):* as addressed in "**Re Group II,** *(no prima facie case)* above, examiner believes the rejection was established by the references and thus was proper. This is also a new argument to a repeated rejection. It is considered that appellants acquiesced to this rejection as well. Please see **Re Group II** *(no prima facie case) above.*

The PRB Papers were cited for teaching monitoring wells along a transect of the PRB zone, and the screen interval is discussed in page 42, paragraph 4 and pages 24-25. The Corps of Engineers Papers teach monitoring wells along a transect of the PRB in Fig 8.1, and section 8 discloses the open screen interval of the well. Since sensors

inherently need contact with the groundwater to measure flow, chemical composition, pH, etc, a monitoring/sampling sensor would also inherently be in the screened section open to groundwater flow so it would work. (Sensors in a section of the well not subject to groundwater flow would become stagnant and readings would be inaccurate). Designing the system for site requirements was pointed out in the first paragraph of page vii, section 1.8 page 9, and page 48, paragraph 5. Routine experimentation and designing the system to meet the site and contaminant parameters would determine the vertical placement of the sensors, as further supported by the cited EPA reference (which one of the appellants co-authored as discussed above) in pages 37-38:

> ***7.3.2 Performance Monitoring System Design***
> *Sample points to evaluate system performance are located within or immediately adjacent to the PRB system. ... Precise placement of well points within the barrier can be problematic, particularly with increasing depth and with thin PRBs. Small vertical deviations can quickly result in screen placement into unintended zones. For example, in a 20 inch wide PRB where a well is positioned in the center of the barrier, a 3% deviation from vertical will cause the well point to exit the reactive media only 16 feet below ground surface. There are, however, rather simple and effective means to verify proper placement. .... Proper location of the screened intervals in three dimensions is important for monitoring different vertical zones within the PRB as well as to provide coverage for different flow paths and allow estimation of degradation or transformation rates as the contaminants pass through the system. Similarly, these same monitoring points can be used for tracer tests to evaluate changes in permeability. <u>The placement of monitoring points for flow path analysis requires prior detailed site characterization to determine flow path direction, flow velocities and system heterogeneities.</u> (Underlining added by examiner)*

Thus, it is considered, as supported by the above teaching, that the placement of monitoring wells is determined by the site requirements and is therefore a matter of choice in engineering design.

Re Group VI – Claims 7, 27, and 53 *(Improper combination of references):* as addressed in "**Re Group 1,** *(Improper combination of references)"* above, examiner believes the combination was proper.

Re Group VI – Claims 7, 27, and 53 *(no prim [sic] facie case):* as addressed in "**Re Group V,** *(no prima facie case)* above. This is also a new argument to a repeated rejection. It is considered that appellants acquiesced to this rejection as well. Please see **Re Group II** *(no prima facie case) above.* Absent any criticality, narrower ranges would be similarly obvious results of experimentation and design to meet site needs.

Re Group VII – Claims 8, 28, and 54 *(Improper combination of references):* as addressed in "**Re Group 1,** *(Improper combination of references)"* above, examiner believes the combination was proper.

Re Group VII – Claims 8, 28, and 54 *(no prim [sic] facie case):* as addressed in "**Re Group V,** *(no prima facie case)* above. This is also a new argument to a repeated rejection. It is considered that appellants acquiesced to this rejection as well. Please see **Re Group II** *(no prima facie case) above.* Absent any criticality, narrower ranges would be similarly obvious results of experimentation and design to meet site needs.

Re Group VIII – Claim 9 *(Improper combination of references):* as addressed in "**Re Group 1,** *(Improper combination of references)"* above, examiner believes the combination was proper.

Re Group VIII – Claim 9 *(no prim [sic] facie case):* as addressed in "**Re Group V,** *(no prima facie case)* above. This is also a new argument to a repeated rejection. It is considered that appellants acquiesced to this rejection as well. Please see **Re Group II** *(no prima facie case) above.* With no further limitation of "transect", examiner used the definition available on-line by accessing the Microsoft ® Bookshelf ® Basics dictionary:

tran·sect
tran·sect (tràn-sèkt') *verb, transitive*
To divide by cutting transversely. (**trans·verse** Situated or lying across; crosswise).[1]

The PRB Paper page 61, paragraph 6 teaches monitoring wells were installed along a transect parallel to groundwater flow. Thus the transect is defined by flow of contaminated aqueous medium, as the groundwater has been described a "contaminated aquifer" inn page 61, paragraph 3. The Corps of Engineers *Paper* shows a transect defined by the groundwater flow in Fig 8.1. Fig. 8.1 is described in Section 8.1.1 on pages 76, 78, and the first 4 lines of page 81, as monitoring well configurations *based on site conditions* (emphasis by examiner). The well screens are described as excluding 1 foot at the top and bottom of the well, and within the reactive media, thus inherently contaminated groundwater flows through the screened interval. Since sensors inherently need contact with the groundwater to measure flow, chemical composition, pH, etc, a monitoring/sampling sensor would also inherently be in the

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screened section open to groundwater flow so it would work. (Sensors in a section of the well not subject to groundwater flow would become stagnant and readings would be inaccurate). Examiner notes that The Corps of Engineers Papers at page v. lines 13-15, teach that *in situ* technologies (are more dependent on site-specific parameters; hence PRB technology (the *in situ* technology being discussed) and its monitoring sites would be expected to be determined based on site parameters.

Re Group IX – Claims 10-14 *(Improper combination of references):* as addressed in "**Re Group 1,** *(Improper combination of references)"* above, examiner believes the combination was proper.

Re Group IX – Claims 10-14 *(no prim [sic] facie case):* Examiner notes the argument regarding the claims 10-14 limitations is also a new argument to a repeated rejection. It is considered that appellants acquiesced to this rejection as well. Please see **Re Group II** *(no prima facie case) above.*

Examiner is not sure of the specific argument being made, other than appellants do not feel the references teach the limitations. Flowmeters are inherently used to measure flow. The wells are believed to be disclosed as upgradient, within, and downgradient of the PRB as discussed at length above. The PRB Papers page 61 paragraph 6 and The Corps of Engineering Papers Fig 8.1 and its description on pages 76-81 teach monitoring wells' sensors were installed along a transect parallel to ground-water flow. Monitoring wells sensors inherently need to be exposed to what they are monitoring (in this case groundwater) to work.

Re Group X – Claim 16 *(Improper combination of references):* as addressed in "**Re Group 1,** *(Improper combination of references)"* above, examiner believes the combination was proper.

Re Group X – Claim 16 *(no prim [sic] facie case):* Examiner notes the argument regarding the claim 16 limitations is also a new argument to a repeated rejection. It is considered that appellants acquiesced to this rejection as well. Please see **Re Group II** *(no prima facie case) above.* Monitoring the effectiveness of treatment, such as determining pH and chemical composition, determines the nature and extent of contamination. PRB treatment of groundwater is the treatment method described in both The PRB Papers and The Corps of Engineers Papers, as discussed in detail above and pointed out in their respective titles. Flowmeters are inherently used to measure flow and thus velocity. Both The PRB Papers and The Corps of Engineers Papers, as discussed in detail above, are used to treat contaminated groundwater, thus inherently the groundwater has been determined to be contaminated prior to PRB treatment.

Re Group XI – Claims 23- to 55 and 29 to 43 [sic] *(Improper combination of references):* as addressed in "**Re Group 1,** *(Improper combination of references)"* above, examiner believes the combination was proper. Examiner notes that claims 36 to 43 are acknowledged by appellants to be cancelled and are not included in examiner's response.

Re Group XII – Claim 62 *(Improper combination of references):* as addressed in "**Re Group 1,** *(Improper combination of references)"* above, examiner believes the combination was proper.

Re Group XII – Claim 62 *(no prim [sic] facie case):* Examiner notes the argument regarding the claim 16 limitations is also a new argument to a repeated rejection. It is considered that appellants acquiesced to this rejection as well. Please see **Re Group II** *(no prima facie case) above.* Two way communication is disclosed as taught by Misquitta in col 6 lines 61 – col 7 line 1, Fig 6, and col 10 lines 41-46. Specifically, the monitoring device 510 is considered the sensor, but col 6 lines 47-60 also disclose monitoring devices within the monitoring well to measure conditions in the well. The monitoring device 510 (for example, a pressure transducer) outputs a signal 410, which can be converted to a digital signal 530 to be received by computer controller 540 which, in response to the signal, transmits flow signal to control a pump, the output of which will affect the monitoring device 510. Col 7 lines 7-col 8 line 13 describe in detail the steps in going from the monitoring device 510 to the computer controller, which calculates new flow rate which is converted to a digital flow signal 550 and converted to an analog flow signal 430 to which the pump 570 responds by changing its flow rate, which will cause the monitoring device 510.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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November 21, 2003

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APPENDIX A

Corrected claims:

1. A method, comprising:

conducting a permeable-reactive barrier (PRB) treatment of a contaminated aqueous medium; and

in-well monitoring by sensing effectiveness of the PRB treatment to generate a signal representing a characteristic of the sensed effectiveness; and

in-well transmitting the signal by wireless communication to a remote collector or monitor.

57. The system of claim 56, further comprising a collector to receive the signal from the transmitter.

66. A system comprising:

a PRB zone to treat a contaminated groundwater; and

a sensor located in a monitoring well substantially along a PRB zone transect of flow of the contaminated groundwater from an up-gradient location, across the PRB zone to a down-gradient location;

wherein the transect of flow is defined by a +- 6 feet wide horizontal plane that transcribes at least one up-stream monitoring well and at least one down-stream well at a level that is +- 1 feet of an open screen interval mid point of each well.

APPENDIX B

Examiner points out that appellants made numerous errors in the description of the supporting references. Only representative errors, or errors of such a significant nature that the quoted reference is rendered inaccurate, are listed:

Regarding The PRB Papers, reference "B"

On page 6, the 1st paragraph under "B", line 3, "convention" should be –conventional--. The 2nd paragraph under "B", line 2, "immobilizes" should not be followed by a period, and "Pros" should be –PRBs--. Line 5, "sorbs" should be --sorb--, and line 7, "cheaters" should be –chelators--.

On page 7, the last paragraph, line 4, "(FeO)" should be –(Fe^0)--, and "Fe" should be --(Fe^0)--. Line 7, "8,32Qcubic" should be --8,320 cubic--. Examiner notes that FeO (ferrous oxide) and Fe (iron) are different from Fe^0 and cannot be used in its place.

On page 8, the 2nd and 3rd lines under the "Results" heading, "Jlg/L" should be --µg/L--.

On page 9, lines 15, 16, 17, 23, 26, and 29, "Pros" should be –PRBs--

The PRB Papers contain summaries of PRB remediation projects at approximately 39 different sites, with different contaminants and layouts, and thus is not conducive to summary, as multiple techniques and applications at 39 different sites are taught.

The examiner also does not agree that the summary of the 192-page non-patent literature reference referred to as The Corps of Engineers Papers is an accurate

summary of the entire document, as multiple techniques and designs were taught. For example, on pages 10-11, appellants describe a "typical PRM *[sic]* monitoring well" and then summarize that "the monitoring wells have a PVC casing (p. 78) and as shown in the page 69 figure include a Bentonite filtercake...". Appellants are incorrectly combining completely different examples – the page 69 figure illustrates a composite barrier slurry wall application with no PVC pipe casing or conduit, but rather an HDPE geomembrane installed vertically in the trench. The trench is then backfilled, and "the inside of the geomembrane then can be filled with a drainage system in which sampling points can be installed to monitor the performance of the system." This monitoring well is not for the PRB (which examiner assumes is what appellants mean by PRM), but for the slurry cut off wall used to divert contaminated water (page 67, first sentence of main section 7.2 "Slurry Walls", which includes the Figure on page 69.

APPENDIX C

Appellants argue that in-well transmission was taught by original specification paragraph [0030]. Examiner notes that paragraph [0030] is silent on transmission, and it appears apppellants are referring to [0031], which was discussed in the final rejection in paragraph 6, pages 12-15. Examiner does not see where [0031] or anywhere else in original application teaches that the wireless transceiver and/or transmitter are in-well. As discussed in the final rejection, only the in-well units comprising at least one sensor and the sensors are disclosed as being in-well. The in-well data is transmitted wirelessly, but there is no teaching in the original specification, including Fig 4 (which does not show the well), that teaches that the wireless transmitter/transceiver unit is inherently or explicitly in-well. Specifically, the examiner finds that Fig 4 shows a ***hardwire*** connection in Fig 4 from the sensors 34 of the sensing unit 28 to the transmiiter 32, as pointed out in page 13 of the final rejection in the underlined line beginning "The unit 28 includes a communications unit which is electronically coupled to the unit". and is taken directly from paragraph [0033] of the original specification. "Electronically coupled" inherenty means hardwired. Thus examiner is required to interpret the phrase "in-well transmitting...by wireless communication" in view of the specification as wireless transmission of in well data at some point, with the wireless transmitter not necessarily limited to being located inside the well. The original disclosure discloses only "in-well sensors" and in fact spells out that the in-well sensors 34/unit 28 are "electronically coupled to the transceiver unit 26", and that the transceiver unit 26

includes the receiver 30 and transmitter 32 capable of transmitting data by hardwired or wireless means:

> ***The monitoring system comprises an in-well unit containing at least one sensor. The unit may include any number of sensors that may be used to monitor groundwater characteristics. The unit is placed down the groundwater monitoring well,*** *typically at the mid-point of the screened interval. Comparison of groundwater data collected within the reactive material and outside the material, both up-gradient and down-gradient can be used to observe changes that the barrier material promotes in the groundwater.* ***The invention can measure important field indicator parameters (sometimes called groundwater quality parameters) without requiring retrieval of formation water by use of a pump.*** *Additionally, the invention provides a method to gain such data in near, real-time and to access such data remotely.*
>
> *FIG. 4 is a schematic representation of a sensing and monitoring system that includes a* ***sensing module 18 or 20*** *that can be used in conjunction with a method and system according to the invention including the embodiments shown in FIG. 1, FIG. 2 and FIG. 3. Referring to FIG. 4,* ***module 18 (or 20) can generate signals (data) corresponding to one or more of the groundwater characteristics at the point of the well location. The module 18 or 20 includes a transceiver unit 26 and an electronically coupled sensing unit 28. Transceiver unit 26 includes a receiver 30 and a transmitter 32, which is capable of transmitting data to collector 22, which can be a data collection center. The signals can be communicated 106 from transceiver unit 26 by any of a hardwired communication connection such as an electrical conductor; by a wireless communication connection such as by radio signals, by satellite communications or by combinations of wireless and hardwired connections.***
>
> *Sensing unit 28 can detect a contaminant of interest or a contaminant level of interest in an influent stream.* ***The sensing unit 28 can includes sensors 34.*** *Suitable types of sensors 34 include a chemical sensor, acoustic wave sensor, fiber optics sensor, solid-state sensor such as a metal oxide semiconductor (MOS), an electrochemical sensor and combinations of such sensors.*

> ***The unit 28 includes a communications unit, which is electronically coupled to the unit*** *and is capable of transmitting data to a data collection center. The signals may be communicated, for example, from a well transceiver to the data collection system by at least one hardwired communication connection, such as, but not limited to, an electrical conductor, wireless communication connections, such as, but not limited to, radio signals, satellite communications and combinations of wireless and hardwired connections. The communications unit also typically comprises an antenna that is connected to the transceiver, unless the communications unit is hardwired. The data collection center comprises a center communications unit that is capable of receiving signals from the transceiver and a control that analyzes the signals and generates information on groundwater characteristics. The control of the data collection system typically includes a "user friendly" data acquisition software package that transforms information into easy-to-read formats.*

It appears apppellants are now asserting that the "in-well transmitting the signal by wireless communication to a remote collector or monitor" must be 100% wireless from the sensor itself to the transmitter to the data collection center, but apppellants never disclosed such information in the originally-filed application, only that data was wirelessly transmitted. Examiner believed, especially after the in-person interview of Feb. 11, 2003, that appellants considered the main point of appellants' argument was that Misquitta did not teach "wireless transmitter" (see interview summary mailed with office action 3/11/2003 which was given in draft to appellants' representative and faxed for approval days after the meeting). Read in view of the specification and the written summary of the interview, examiner interpreted "in-well transmitting the signal by wireless communication to a remote collector or monitor" to mean transmitting the in-well signal by wireless means

rather than interpret that appellants were introducing new matter. Fig 4 also shows wired communications (solid lines) between sensors 34, receiver 30, and transmitter 32 and shows communication (106) which is wireless (dotted lines) only between transmitter 32 and data collector 22. Further, absolutely no criticality was provided for wireless transmission. Specifically, the original claims had wireless and hardwired as equal alternatives, as did the original specification, and no criticality is ever provided. Thus it is only the in-well sensor/sensing unit (as opposed to pumped retrieval of samples), not the wireless transmission, which contributes to a passive system.

Appellants had wireless transmission in Misquitta in col 8 lines 14-40 cited on page 9, lines 6-8 of the office action mailed on 11-5-2002, and on page 7, lines 8-9 of the office action mailed on 1/23/2003. Appellants refer to col 8, lines 41-50 to show that Misquitta does not teach wireless transmission, and that is true, but Misquitta has at least "preferred, yet another, and a more preferred" embodiments, and the "in yet another embodiment, shown in Fig 8, condition signal 410 from monitoring device 510 is transmitted by wireless means, such as radio waves, to computer controller 540". (col 8, lines 21-23) .